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**A NEW CALIFORNIAN CHITON.**

BY S. S. BERRY.

Through the kindness of Dr. Harold Heath, of Stanford University, I have had placed at my disposal a series of small chitons dredged by him in Monterey Bay, Cal. Among them are several specimens of the curious *Mopalia heathii* and an equally aberrant allied species which seems undescribed. To contain these anomalous forms, I propose the following new group.

**DENDROCHITON** nov. subgenus.

Species small; valves divided into more or less distinct areas in the usual manner; insertion plates as in *Ischnochiton*, the posterior valve without a posterior-median sinus. Valve I with 7-8 slits; valves II-VII with 1,1 slits; valve VIII with 6-8 slits. Sculpture variable, as in *Mopalia*. Girdle covered above with minute ovoid spinelets or spicules, larger on the lower surface. Sutural and intersutural tufts present, the former well developed with a very long and branching central bristle.

This subgenus in large measure breaks up the distinction between the *Mopaliidae* and the *Ischnochitonidae*, presenting many of the features proper to both groups. In this connection it should be remarked that the girdle of even the true *Mopalias* is not strictly nude, but in the young, at least, is furnished (though not densely) with minute spinelets very similar to those of *Dendrochiton*.

Type: the following species.

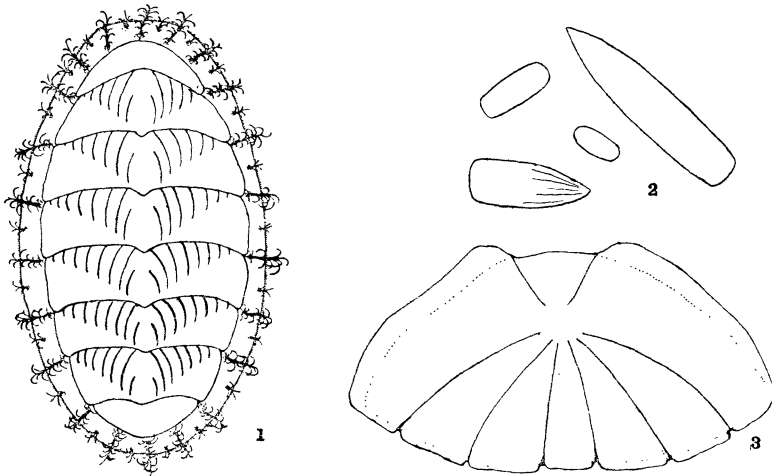
**Mopalia (Dendrochiton) thamnopora** n. sp. Plate XL, figs. 4, 5, 6, 8.

Shell small, oblong, rather narrow for *Mopalia*, much elevated and strongly carinated, the side slopes nearly straight.

Valves sharply beaked in front; the lateral areas fairly well defined, not raised, having a few very faint radial grooves, but without well-marked sutural or diagonal ribs. Central areas ornamented with a series of about nine or ten very strong, low, broad, longitudinal riblets, curved and converging toward the median ridge; their intervals of nearly equal breadth, not latticed or otherwise sculptured. On the jugal tract these ribs are obsolete or wanting. Entire surface minutely granular-porous, but not so

distinctly as in *M. (D.) heathii*, and due largely to the numerous sense organs which under high power appear with great clearness.

Anterior valve everywhere very finely granulose, otherwise without distinct sculpture. Central area of posterior valve reduced, but similar in ornamentation to those of the median valves; mucro anterior to the middle of the tegmentum; posterior slope steep, slightly concave; posterior margin of the tegmentum in general semicircular, but rather abruptly (though not extensively) squarish truncate or emarginate at the middle.



*Mopalia thamnopora*.—1. Outline of entire animal. 2. Girdle spines. 3. Outline of interior of tail valve.

Anterior valve with 7 slits; intermediate valves with 1,1 slits; tail valve "ischnoid," with a regular crescentic insertion plate cut by 6 slits. Sinus broad, rather shallow; in last valve narrower and minutely crenulate. No median sinus behind, and no indications of an approach to this condition other than the above-noted squaring of the tegmentum.

Girdle narrow, apparently nude even under a hand lens, but shown by high power to be well clothed above with numerous exceedingly minute, not very crowded, ovoid spicules developed into stout elongate spines at the margin. The spinelets of the lower surface are longer, flatter and more pointed than those of the upper, being somewhat intermediate in character between these and the marginal ones.

Opposite each suture is a pore from which springs a group of

about six recurved bristle-like hairs surrounding a single much larger and longer bristle, which branches freely, and in living or alcoholic material is a prominent feature even to the unaided eye. Being very brittle, these structures are frequently broken off, but their stumps or pores are always evident and show a very regular arrangement. Apparently homologous with the sutural tufts are two similar ones on each side of the head valve, one on either side of the tail valve, and one in the median line in front and behind. In addition there is a second series of much smaller but equally distinct tufts lying just outside of the first and in more or less regular alternation with them, as shown in fig. 1. The long central bristles have a thickened sheath-like base from which are given off slender, more or less recurved, hair-like processes. Altogether there are 22 of these major tufts besides an equal or slightly larger number of the minor (alternating) ones.

Color (in alcohol) a deep rose-pink, which may be either (1) without mottlings, or (2) with a stripe of reddish-brown along each side, or (3) with a broad irregular clouding of pale green, accompanied by some lateral spots of brown or Indian red, or (4) with median spots of bright orange-yellow on some of the valves, and lateral markings of Indian red.<sup>1</sup> The typical form seems to be pink with sutural spots of brown and more or less green suffusion. The girdle shows alternating bands of burnt sienna and pale buff. The latter are sutural in position and there are also small intersutural spots of the same color. The interior is rose, paler toward the edges, but not so vivid as in *M. (D.) heathii*.

Length of largest specimen, 9 mm.; width 5 mm.

Type locality: Off Monterey, Cal., in about 15 fathoms (H. Heath, 1908). Fifteen specimens examined, as follows:

No.	Locality.	Depth.	Collector.	Date.	Author's Register.
11	Off Monterey, Cal.	15 fms.	H. Heath.	1908.	(8)
3	Off Monterey, Cal.	12 fms.	S. S. Berry.	June, 1906.	(9)
1	Pacific Grove, Cal.	Low tide.	S. S. Berry.	June, 1906.	(10)

*M. (D.) thamnopora* seems nearer to the *Mopalia heathii* of Pilsbry than to any other form known to me, but is so widely diver-

<sup>1</sup> This specimen has the usual ground color of pink with numerous small white spots and a few larger lateral ones of Indian red, but is remarkable in that the central area of the first and second valves only is a clear bright cadmium-yellow.

gent in sculpture as well as in other particulars that a glance is sufficient to separate the two. They agree in the characters upon which I have founded the present subgenus, but otherwise do not seem to be remarkably close. For the sake of comparison, a few notes upon the latter species are appended.

**Mopalia (Dendrochiton) heathii** Pilsbry. Pl. XL, figs. 1, 2, 3, 7.

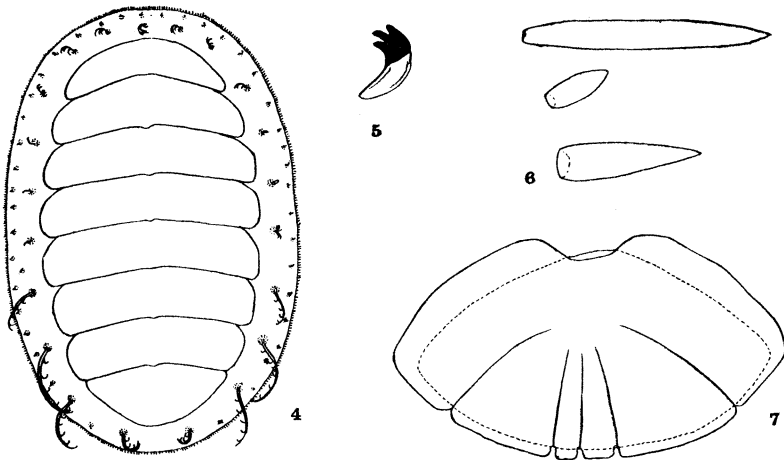
*Mopalia heathii* Pilsbry ('98), p. 288.

*Mopalia heathii* Keep ('04), p. 350 (merely listed).

*Mopalia heathii* Thiele ('10), pp. 108, 109.

Shell small, oblong, elliptical, wide in relation to its length, carinated, rather elevated, the side-slopes nearly straight.

Valves wide and short, little beaked; the lateral areas not raised, ill defined; central areas without sculpture<sup>2</sup> save the very fine, even, rather distant granulation which covers the whole surface. Posterior valve with semicircular posterior outline, the mucro anterior in position; posterior slope concave, but not so steep as in *M. thamnopora*.



*Mopalia heathii*.—4. Outline of entire animal. 5. Large lateral tooth of the radula. 6. Girdle spines. 7. Outline of interior of tail valve.

Anterior valve with 8 slits; intermediate valves with 1,1; last valve "ischnoid," with a regular crescentic insertion plate cut by 5-8 slits. In the intermediate valves the insertion plates are continuous across the sinus.

<sup>2</sup> Pilsbry writes: "The intermediate valves very faintly radially trisulcate at the sides," but my specimens exhibit this feature with difficulty.

Except for the sutural bristles, the girdle is stated to be nude; but examination of specimens mounted in xylol or balsam and especially dissolving fragments in Javelle water shows that the condition is approximately the same as in *D. thamnopora*, although the spicules are even smaller than in that species. In none of the specimens seen were the bristles still adherent at all of the sutures. Usually they are lost except around the posterior valve, and even here they are rarely unbroken. When complete they are longer than in the preceding species, more slender, lack any appearance of surrounding hairs at the base and give off shorter and less numerous recurved processes. Originally there seem to have been one bristle opposite each suture, from two to five in front of the head valve, and two behind the tail valve. There is no mention made by Pilsbry of intersutural tufts, but I find that very small inconspicuous bristles are sometimes evident in the centre of the round whitish spots which are to be seen about the periphery. Although so greatly reduced they seem clearly homologous with the structures holding a similar relation in the preceding species.

The color ornamentation is described by Pilsbry as follows: "(1) olive-green with some lighter spots, or purplish maculation, or slight roseate suffusion, or (2) vivid red, with scattered blue spots." With one exception my specimens are all of the latter type, agreeing with one another further in that valve VI, and to a less extent valves V and VII, are irregularly clouded with a pale greenish hue.

The nine specimens I have seen are doubtless all immature. Length of largest 11 mm.; width 7 mm.

Type: No. 71,902, A. N. S. P.

Type locality: Monterey Bay, Cal. (H. Heath, 1897).

Specimens examined:

No.	Locality.	Depth.	Collector.	Date.	Author's Register.
9	Off Monterey, Cal.	15 fms.	H. Heath.	1908.	(3)

Thiele has suggested that *Mopalia heathii* may be a *Ceratozona*, but although it is certainly suggestive of that genus in several ways, I fail to see that it does not show equally significant approximation to the group in which it was originally placed. The truth is that the diagnosis of either genus, as previously recognized, would have

to be so greatly amplified to admit of the reception of the forms now before us that the erection of a new group would seem to be at present the safest course.

#### LITERATURE.

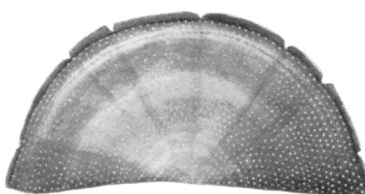
- KEEP, JOSIAH. ('04.) *West American Shells*. San Francisco, 1904.  
 PILSBRY, HENRY A. ('92.) Monograph of the Polyplacophora. *Man. Conch.* (1), XIV, 1892.  
 — ('98.) Chitons collected by Dr. Harold Heath at Pacific Grove, near Monterey, Cal. *Proc. Acad. Nat. Sci. Phila.*, 1898, pp. 287-290.  
 THIELE, JOHANN. ('10.) Revision des Systems der Chitonen. II. Teil. *Zoologica*, Heft 56, Bd. 22, pp. 71-126, Pls. VII-X, 1910.

#### EXPLANATION OF PLATE XL.

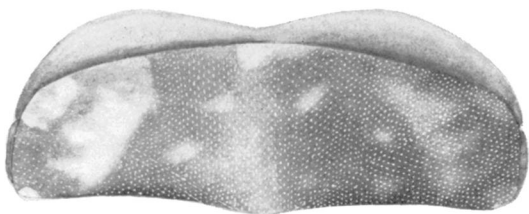
- Fig. 1.—*Mopalia heathii* Pilsbry. Head valve, exterior.  
 Fig. 2.— “ “ “ Third valve, exterior.  
 Fig. 3.— “ “ “ Tail valve, exterior.  
 Fig. 4.—*Mopalia thamnopora* Berry. Head valve, exterior.  
 Fig. 5.— “ “ “ Tail valve, exterior.  
 Fig. 6.— “ “ “ Fifth valve, exterior.  
 Fig. 7.—*Mopalia heathii* Pils. Sutural bristle.  
 Fig. 8.—*Mopalia thamnopora* Berry. Sutural bristle.



1



4



2



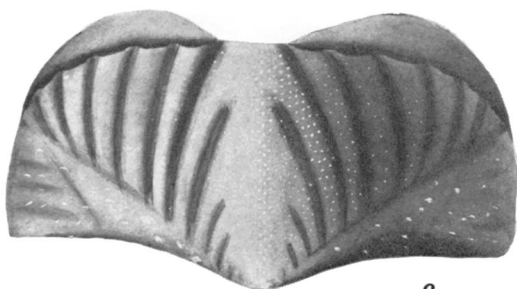
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3



7



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8